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Introduction

As networked work environments become more pervasive and virtual organizations, facilitated by Information Technology, become a reality over the coming decades; and as the importance of collaboration and team work continues to play a key role in how organizations and executives work, it is imperative to investigate and assess the implications of this on the process and outcomes of team work and group decision-making.

The purpose of this research is to study the effects of computer mediation, using commercially available group decision support software, on the process and outcomes of group decision making. In particular, this study investigates how and why computer mediation causes group choices to be different from initial individual choices, if at all. The social psychology literature, which we briefly review in the following section, documents group choices to be different from individual choices. In the proposed study our interest is in assessing the contribution of technology to this phenomenon which is referred to as "group-induced attitude polarization" [Isenberg, 1986].

Group-induced attitude polarization, also referred to as "choice shift," "group polarization" or "risky shifts," has fascinated social psychologists for over thirty years. Numerous theories have been proposed and a large body of literature [For reviews see, Pruitt, 1971; Lamm and Myers, 1978] that indicates that group interaction frequently results in members changing and enhancing their prior beliefs in a certain direction has been established. There are several explanations for group induced attitude polarization. One of the most dominant explanations and the focus of this paper is *Persuasive Arguments Theory* (PAT) [Pruitt, 1971; Lamm and Myers, 1978; Isenberg, 1986].

The objective of this study is to understand both the processes and outcomes of business decision making in the presence of IT. Specifically, we would like to examine:

1. Can group polarization be documented in business settings?

2. Can Persuasive Arguments Theory account for why group polarization occurs? and do persuasive arguments change as we move from face-to-face to computer- mediated meetings?

Overview of Relevant Literature

Stoner [1961] was the first to observe that decisions arrived at by individuals are different from those arrived at by groups composed of the same individuals. He further observed that the tendency of the group typically was toward a riskier decision. This phenomenon was therefore originally labeled as "Risky Shift." Past research has documented the occurrence of group polarization in directions of risk as well as caution. In keeping with the findings over the years, the label for this phenomenon has now been changed to "group-induced attitude polarization."

PAT asserts that informational influence is a strong determinant of polarization. This view emphasizes that "group influence resides in the substance of what other people have to say" [Lamm and Myers 1978, p. 169]. The perspective of Persuasive Arguments theorists is that the source of the arguments is not as important as the message characteristics [Isenberg, 1986].

Research Method

As mentioned above, the purpose of this study is to understand both the processes and outcomes of group decision making. Specifically, we examine in this paper the role of PAT in explaining group polarization in both face-to-face and computer- mediated meetings. In order to accomplish this, a quasi-experiment was conducted. Because of the nature of the data, a content analytic approach to data analysis was followed. Subjects for this experiment were MBA students at a large southern university. A total of a 107 subjects participated in this study. The subjects worked in group sizes of 4 or 5. The groups are setup as part of the MBA program and as such the subjects have approximately a 9 month working relationship with members of the group.

Process

The experiment was conducted as part of a three hour seminar. Participants completed a "Strength Deployment Inventory" (SDI) questionnaire. This questionnaire is an instrument to classify individual decision making styles in group settings. In particular, it assesses how individuals relate to others under conditions when "everything is going well" and when "faced with conflict and opposition." Each participant was provided a copy of the two tasks to be attempted. The subjects were required to complete these tasks together with the SDI prior to arriving at the seminar.

As part of the seminar, the subjects completed both tasks in either a face-to-face meeting or in a groupware supported meeting. The subjects were directed to discuss the issues underlying the tasks and to reach consensus regarding a course of action. For the face-to-face meeting, subjects were sent to breakout rooms. The groupware supported meetings were conducted in a lab using "The Meeting Room™" software. Meetings for both these setting were captured in their entirety on either video tape or as groupware transcripts.

Task

Two tasks were used as part of this seminar. Both of these tasks focused on the Intel corporation and the Pentium related problems. The first task requested subjects to advise Intel on a course of action related to its business strategy. The participants were also required to fill out a questionnaire (on a scale of 1 to 7) indicating their position on a scale that ranged from advising Intel to pursue interests strictly as an engineering company to pursuing their interests strictly as a consumer oriented company. The second task addressed the Pentium problem more directly and requested participants to explore issues in developing Intel's policy to deal with the Pentium problem. The range of expected responses on this questionnaire ranged from recommending a complete product recall, replacement and restitution to a complete denial of the existence of the problem.

Analysis

In an attempt to capture both process and outcome, data analysis followed a two step procedure. The outcome variables were extracted from the questionnaires that were completed in each of the three situations, namely individual, face-to-face and groupware supported. The significance of the differences among the three situations were verified using statistical methods. In addition, protocol analysis enabled us to gain a better understanding of the underlying process.

Results

The first question addressed by this study was whether group polarization occurs in business settings. To document group polarization, we focused on three characteristics defined by Lamm and Myers [1978], namely: strengthening of the dominant tendency within a group; amplification of the tendency by discussion; and, ability of a group to polarize without individual members becoming polarized. Based on a comparison of the individual responses on the questionnaires and the consensus in both face-to-face and groupware settings the existence of group polarization was established using paired t-tests.

Protocol analysis was used to address the second question. A coding scheme was developed based on PAT. Using this coding scheme, two coders documented attributes defining persuasive arguments: validity, novelty, recency, number of arguments [Isenberg, 1986].

Using the coding scheme presented below and our protocol analysis of the transcripts we were able to establish a significant role for PAT in explaining group polarization. Furthermore, it was interesting to note that the arguments on each of these four dimensions showed a change when the setting for the meeting was changed from face-to-face to groupware supported or vice versa.

	Attributes		**Definition**
1.	Validity	a.	how true is the argument?

	b. does the argument fit into the person's previous views?	
	c. does the argument logically follow from accepted facts or assumptions?	
	d. does the argument directly contribute to the final outcome?	
2. Novelty	a. does the argument represent a new way to organize information?	
	b. does the argument suggest new ideas?	
	c. does the argument trigger additional supporting information?	
3. Recency	a. timing of follow up comments	
	b. recency of comments	
4. Number of arguments	a. count on the number of support arguments	

Discussion and Conclusions

Previous work has suggested a strong relationship between PAT and group polarization. Our study also documents this link. Despite the strong support for PAT, it should be mentioned that PAT attributes did not account for the verbalizations in their entirety. This indicates the existence of other forces that are playing a role in defining group polarization. In particular, it is noteworthy to mention that in the groups supported by technology there was a definite recurrence of a phenomenon that we label *frivolous.* In the face-to-face meetings individuals were more task focused. The impact of frivolous behavior was two-fold, first, it lengthened the duration of the groupware supported meeting, and second it caused the group to entail added effort in reaching consensus. Both of these finding are supported by prior GDSS research.

Finally, while the effects of polarization were found in both face-to-face and groupware supported meetings, the direction of the polarizing effects were not necessarily in the same direction. In fact, it is interesting to note that individuals had a tendency to polarize in one direction in the face-to-face setting and then polarize in the opposite direction when in groupware supported meetings. In effect, what we are seeing is an initial polarization and a subsequent depolarizing effect.

In summary, we have demonstrated that group polarization does occur in business settings in both face-to-face and meetings supported by groupware. Also, we have shown that while PAT plays a dominant role in accounting for group polarization, other forces also play a significant role especially in computer-supported meetings. Finally, the depolarizing effect of groupware meetings observed in this study have implications for both practitioners and future researchers.

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